US 20150046166A1

(19) **United States**

(12) **Patent Application Publication**

SHIH et al.

(10) **Pub. No.: US 2015/0046166 A1**

(43) **Pub. Date: Feb. 12, 2015**

(54) **METHODS AND SYSTEMS FOR MUSIC INFORMATION MANAGEMENT**

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(21) Appl. No.: **13/964,117**

(22) Filed: **Aug. 12, 2013**

Publication Classification

(51) **Int. Cl.**

G10L 15/00 (2006.01)

G06F 3/16 (2006.01)

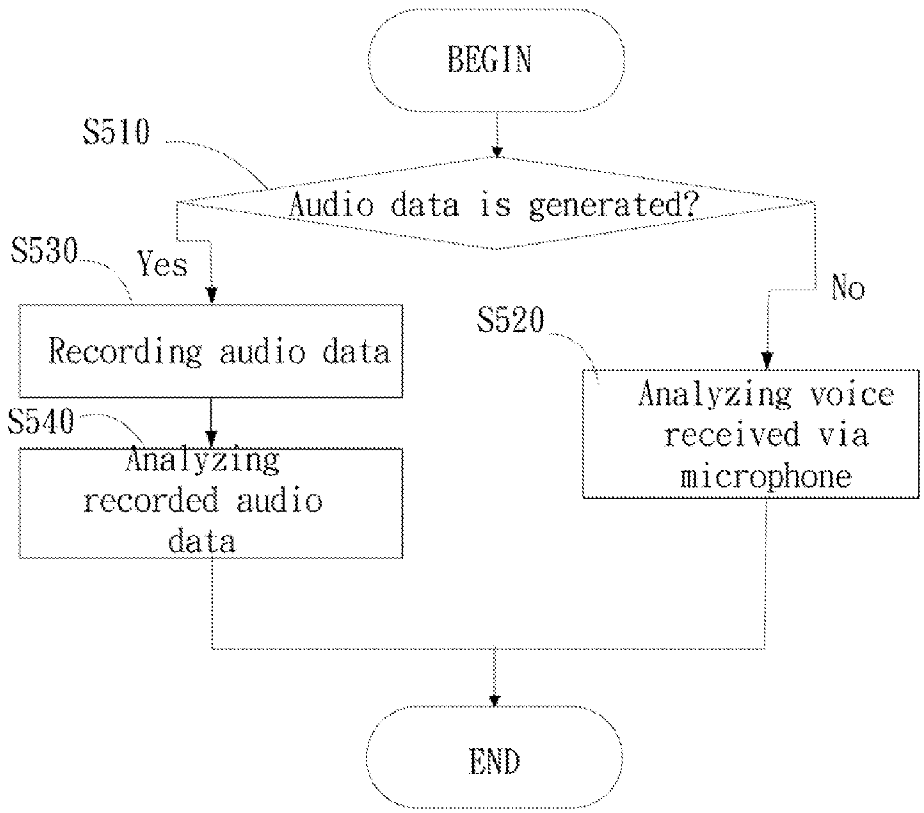
(52) **U.S. Cl.**

CPC ***G10L 15/00*** (2013.01); ***G06F 3/165*** (2013.01)

USPC **704/270**

(57) **ABSTRACT**

Methods and systems for music information management are provided. When audio data is generated in an electronic device, a control module is notified to launch a specific application to perform a music recognition procedure for the audio data, thus to obtain music information corresponding to the audio data.



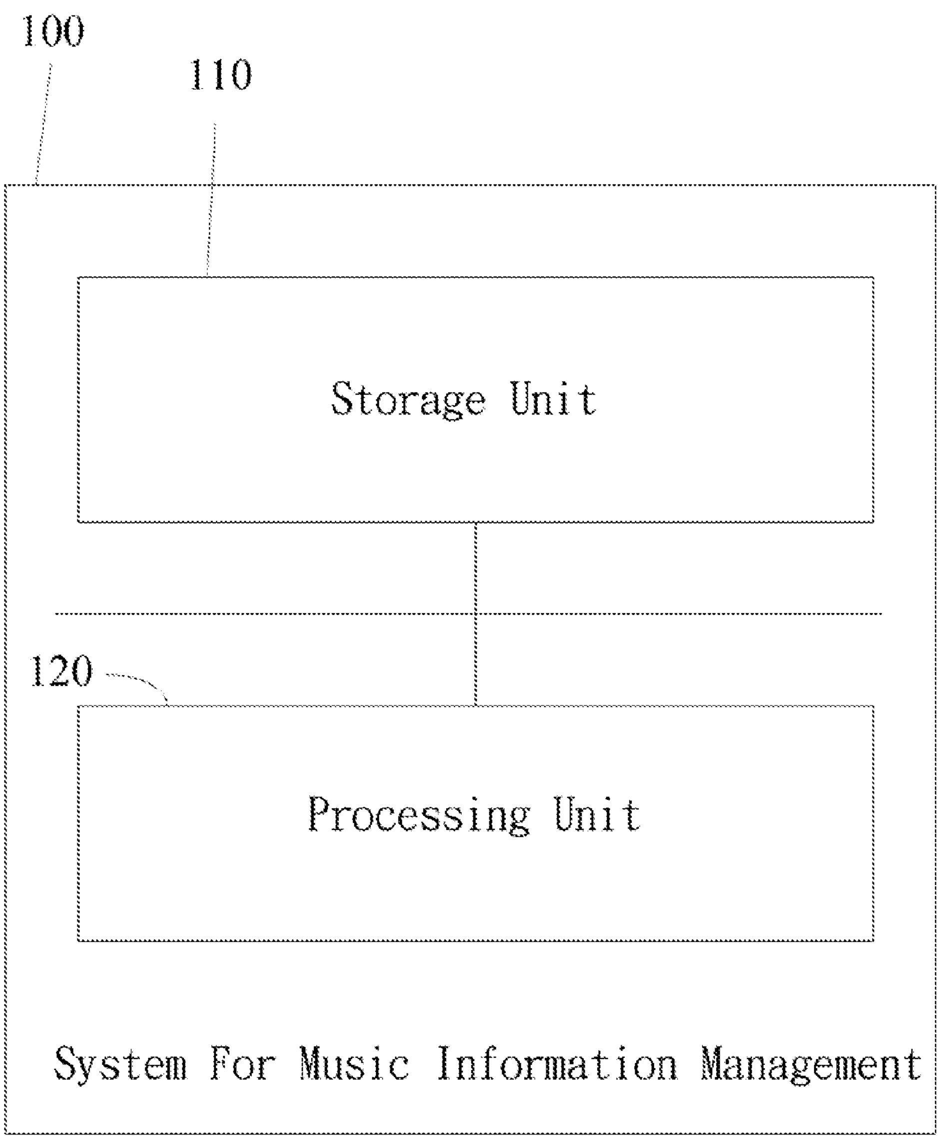

100
110
Storage Unit
120
Processing Unit
System For Music Information Management

FIG. 1

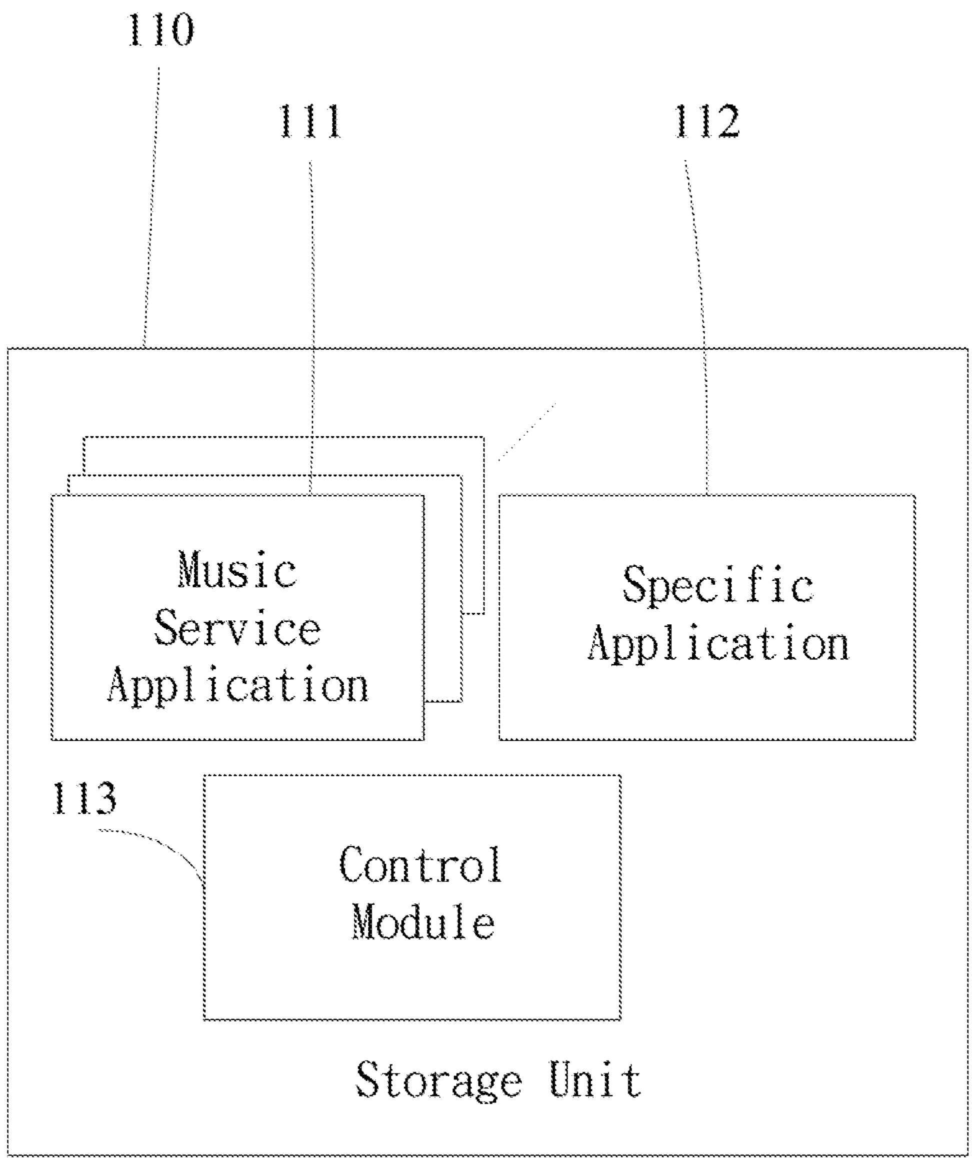

110
111
112
Music
Service
Application
Specific
Application
113
Control
Module
Storage Unit

FIG. 2

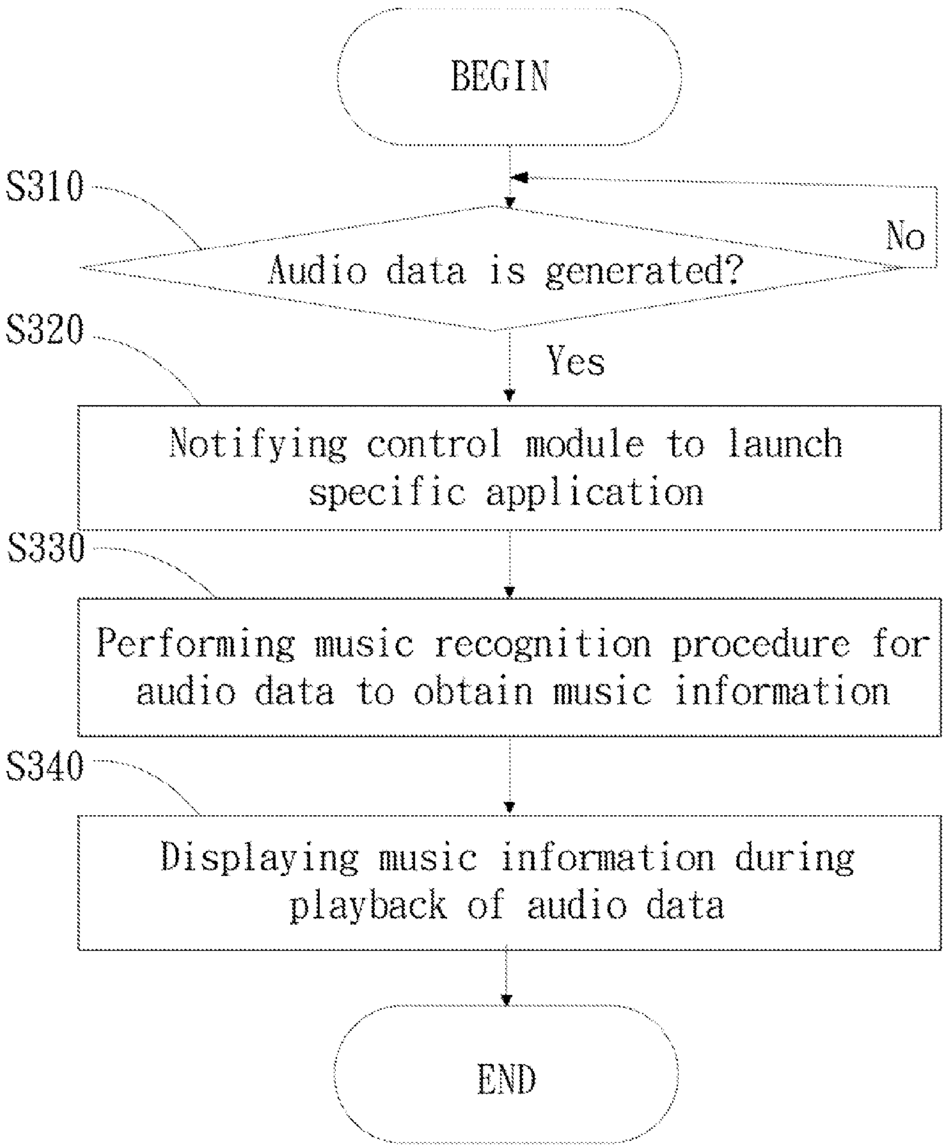

BEGIN
S310
Audio data is generated?
No
Yes
S320
Notifying control module to launch specific application
S330
Performing music recognition procedure for audio data to obtain music information
S340
Displaying music information during playback of audio data
END

FIG. 3

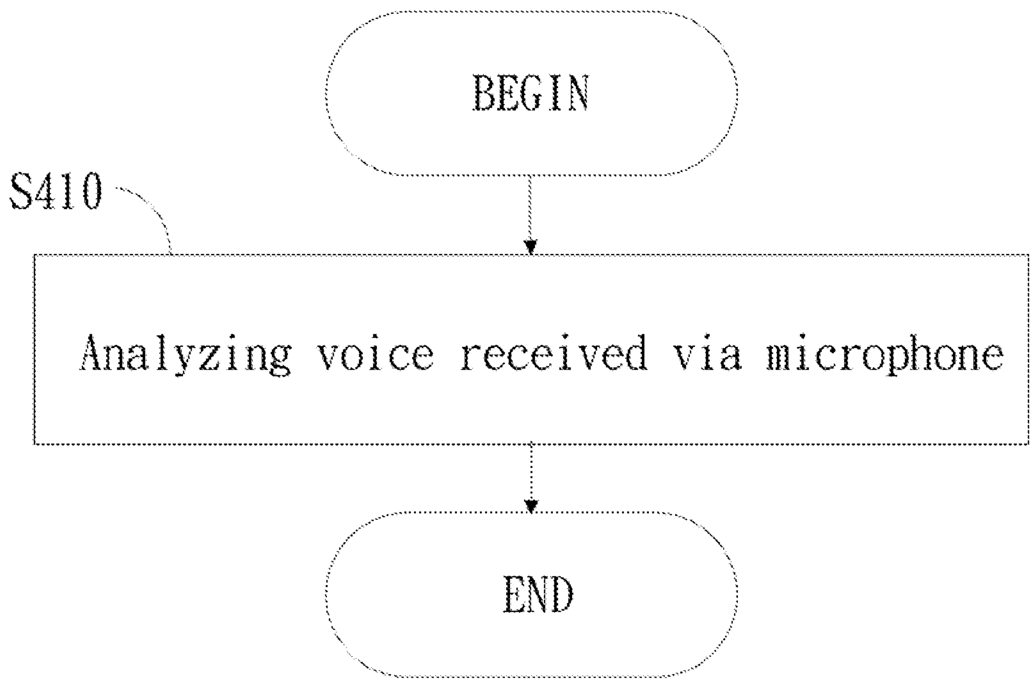


FIG. 4

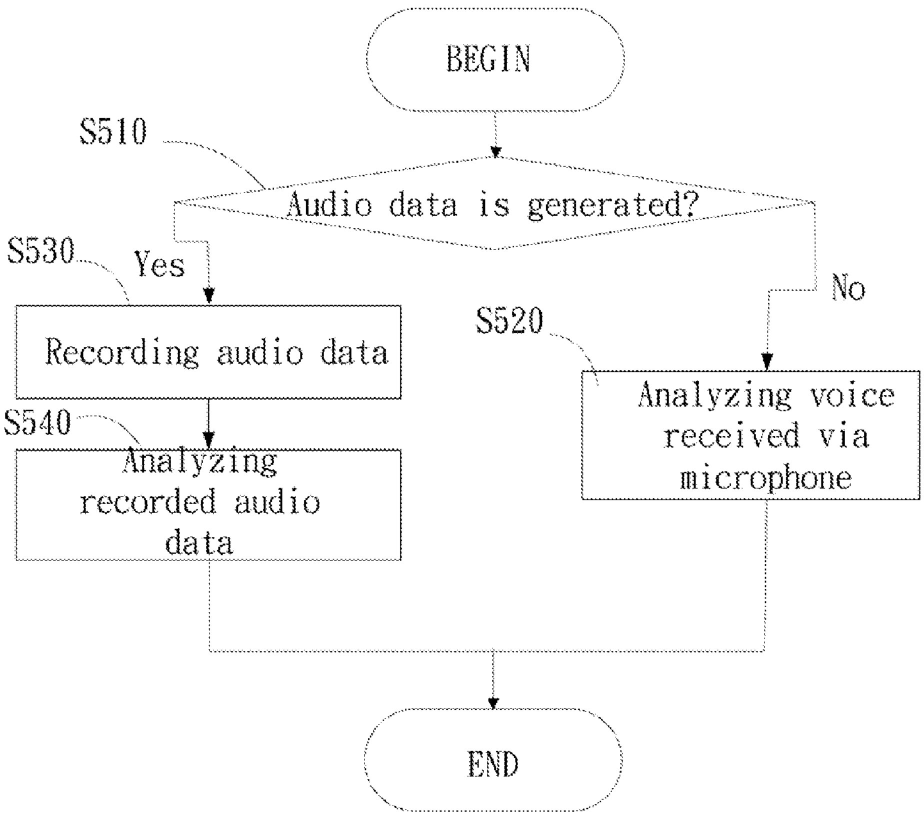

BEGIN
S510
Audio data is generated?
S530
Yes
Recording audio data
S540
Analyzing recorded audio data
No
S520
Analyzing voice received via microphone
END

FIG. 5

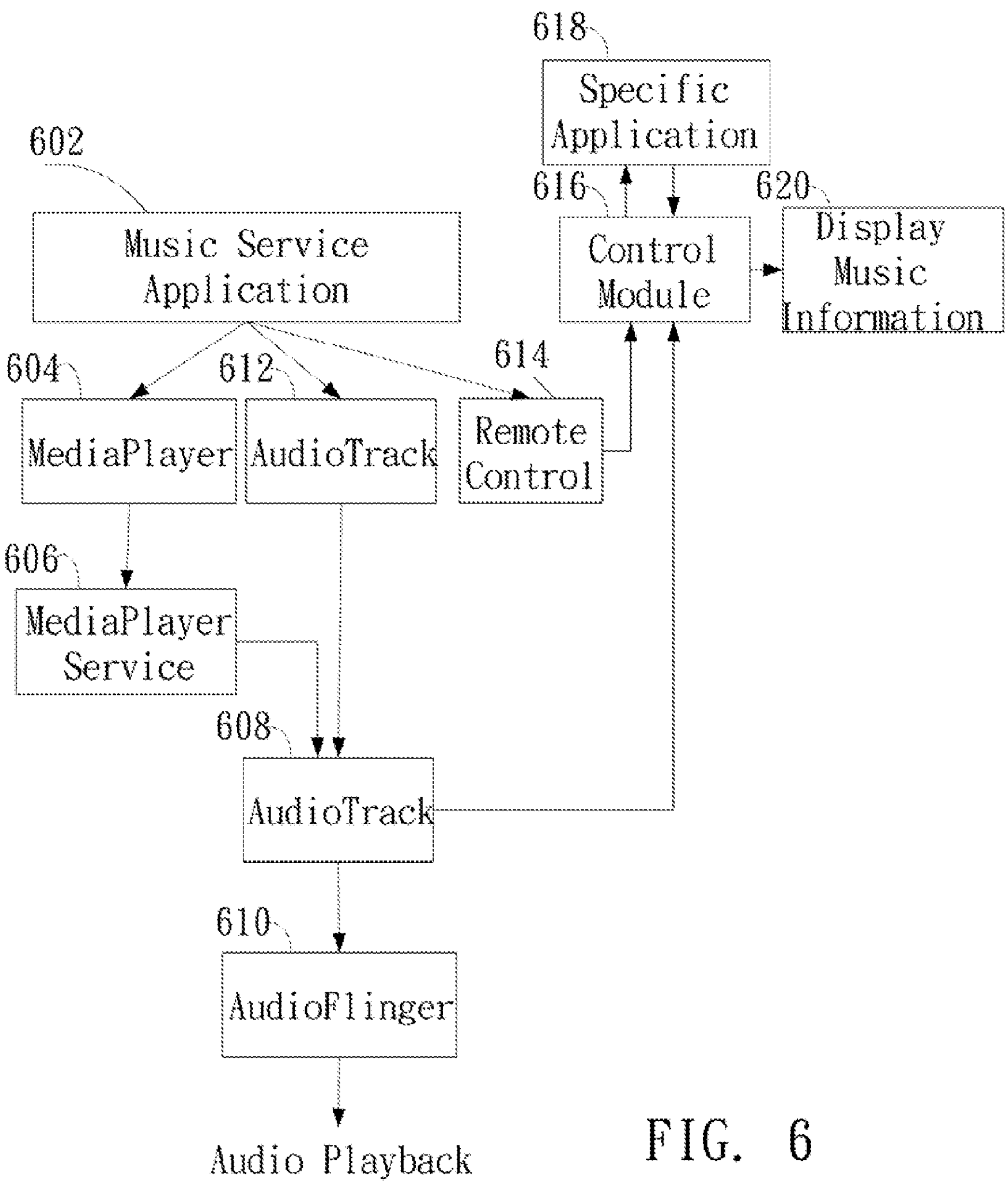

618
Specific Application
602
616
620
Music Service Application
Control Module
Display Music Information
604
612
614
MediaPlayer
AudioTrack
Remote Control
606
MediaPlayer Service
608
AudioTrack
610
AudioFlinger
Audio Playback

FIG. 6

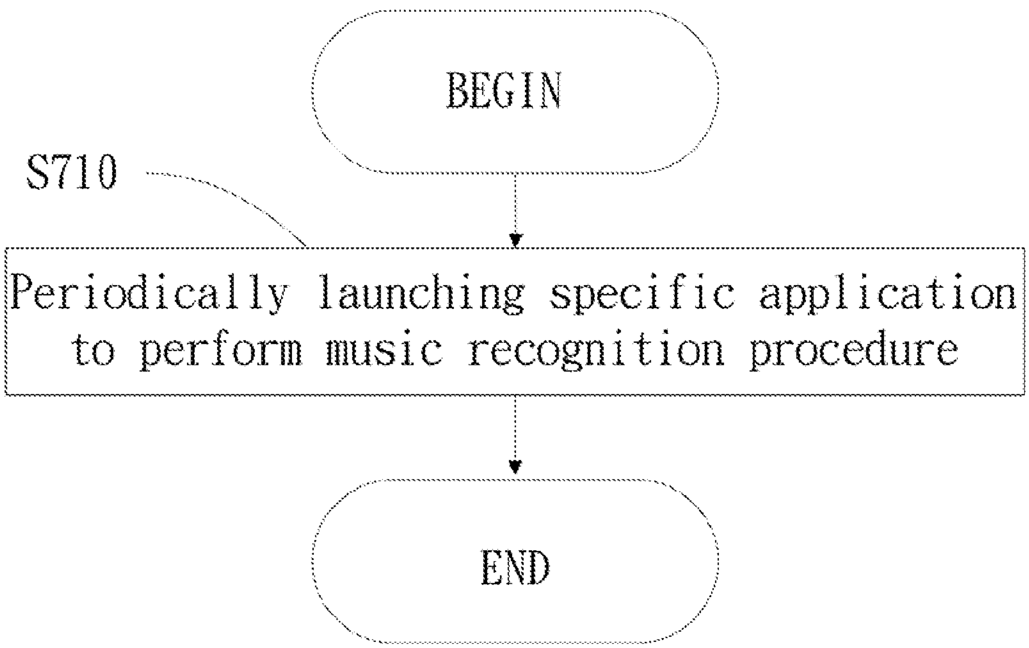

BEGIN
S710
Periodically launching specific application to perform music recognition procedure
END

FIG. 7

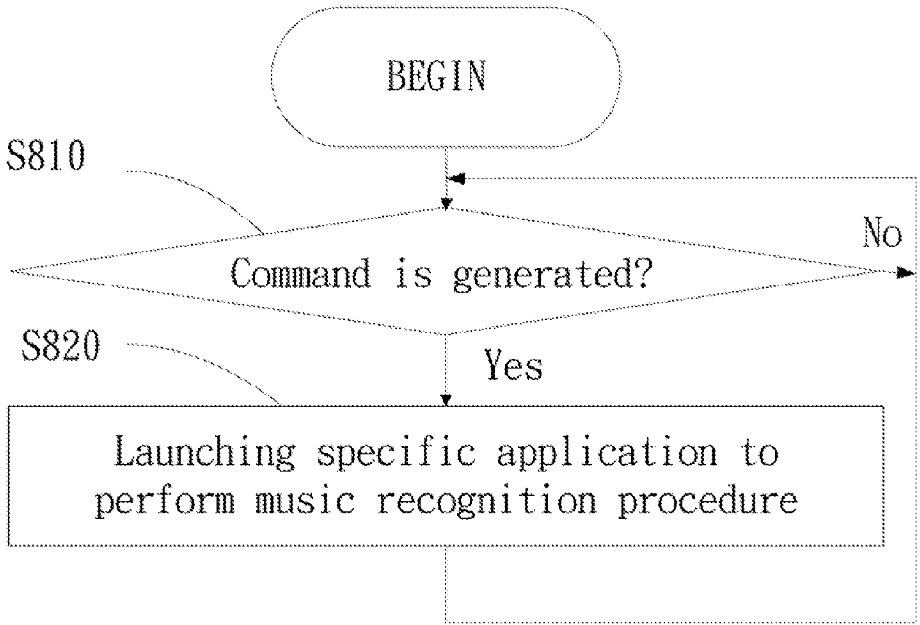

BEGIN
S810
Command is generated?
No
Yes
S820
Launching specific application to perform music recognition procedure

FIG. 8

METHODS AND SYSTEMS FOR MUSIC INFORMATION MANAGEMENT

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The disclosure relates generally to methods and systems for music information management, and, more particularly to methods and systems that can launch a specific application to perform a music recognition procedure for audio data, thus to obtain corresponding music information.

[0003] 2. Description of the Related Art

[0004] Recently, portable devices, such as handheld devices, have become more and more technically advanced and multifunctional. For example, a handheld device may have telecommunications capabilities, e-mail message capabilities, an advanced address book management system, a media playback system, and various other functions. Due to increased convenience and functions of the devices, these devices have become necessities of life.

[0005] As described, a handheld device may have a media playback system. In some cases, the handheld device may be equipped with high performance speakers, thereby providing stereophonic experiences of audio for users. Generally, during the playback of music, metadata of the currently played music, such as the title or singer of the music can be displayed in a user interface. It is noted that, the metadata must edited in the music file in advance. If no metadata can be found in the music file, no information can be displayed. Additionally, the content of metadata that can be edited in the music file is limited.

[0006] Further, some music services in the handheld device are performed on a network basis, in which audio data is received by or generated in the handheld device in a stream manner. In such cases, no music information can be obtained and displayed.

BRIEF SUMMARY OF THE INVENTION

[0007] Methods and systems for music information management are provided.

[0008] In an embodiment of a method for music information management, when audio data is generated in the electronic device, a control module is notified to launch a specific application to perform a music recognition procedure for the audio data, thus to obtain music information corresponding to the audio data.

[0009] An embodiment of a system for music information management comprises a storage unit and a processing unit. The storage unit comprises a specific application, wherein the specific application has a music recognition procedure. When audio data is generated in the electronic device, the processing unit notifies a control module to launch the specific application to perform the music recognition procedure for the audio data, thus to obtain music information corresponding to the audio data.

[0010] In some embodiments, the music information corresponding to the audio data is further displayed in a user interface during the playback of the audio data.

[0011] In some embodiments, the specific application performs the music recognition procedure by analyzing a voice received via a microphone of the electronic device, wherein the voice corresponds to the playback of the audio data by the electronic device.

[0012] In sonic embodiments, the electronic device has a network connection capability, and the music information is downloaded from a network.

[0013] In some embodiments, when a remote control function for music services is provided in the electronic device, the control module is further notified to launch the specific application to perform the music recognition procedure when a command is generated by the remote control function. In some embodiments, the remote control function further obtains music information corresponding to the audio data, and provides the music information to the control module for display.

[0014] In some embodiments, the control module further periodically launches the specific application to perform the music recognition procedure.

[0015] Methods for music information management may take the form of a program code embodied in a tangible media. When the program code is loaded into and executed by a machine, the machine becomes an apparatus for practicing the disclosed method.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The invention will become more fully understood by referring to the following detailed description with reference to the accompanying drawings wherein:

[0017] FIG. **1** is a schematic diagram illustrating an embodiment of a system for music information management of the invention;

[0018] FIG. **2** is a schematic diagram illustrating an embodiment of a storage unit of the invention;

[0019] FIG. **3** is a flowchart of an embodiment of a method for music information management of the invention;

[0020] FIG. **4** is a flowchart of an embodiment of a performance of a music recognition procedure of the invention;

[0021] FIG. **5** is a flowchart of another embodiment of a performance of a music recognition procedure of the invention;

[0022] FIG. **6** is a schematic diagram illustrating an example of music information management under the framework of ANDROID system;

[0023] FIG. **7** is a flowchart of an embodiment of a timing for launching a specific application to perform a music recognition procedure of the invention; and

[0024] FIG. **8** is a flowchart of another embodiment of a timing for launching a specific application to perform a music recognition procedure of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0025] Methods and systems for music information management are provided.

[0026] FIG. **1** is a schematic diagram illustrating an embodiment of a system for music information management of the invention. The system for music information management **100** can be used in an electronic device, such as a computer, or a portable device, such as a digital camera, a handheld device such as a mobile phone, a smart phone, a PDA (Personal Digital Assistant), a GPS (Global Positioning System), or any picture-taking device.

[0027] The system for music information management **100** comprises a storage unit **110** and a processing unit **120**. As shown in FIG. **2**, the storage unit **110** comprises a plurality of music service applications **111**, a specific application **112**, and a control module **113**. The music service application **111**

can play audio data located in the electronic device, and/or audio data downloaded from a web server in a stream manner via a network, such as the Internet. In some embodiments, the music service application **111** may be MEDIAPLAYER, SPOTIFY, KKBOX, RDIO, PANDORA, or other. The specific application **112** can perform a music recognition procedure for audio data, such that the specific application **112** can obtain music information corresponding to the audio data. It is understood that, in some embodiments, the audio data may be a part of music, which may be generated for the music service application **111**. It is understood that, the specific application **112** can perform various methods to recognize the audio data, and the present invention is not limited to any music recognition method. Further, the music information corresponding to audio data may be various. For example, the music information may be a title of the music or an album corresponding to the audio data, lyrics of the music corresponding to the audio data, a singer name of the music corresponding to the audio data background information of a singer of the music corresponding to the audio data, the albums which have been published by the singer of the music corresponding to the audio data, and others. It is understood that, in some embodiments, the system for music information management **100** or the electronic device may have a network connection capability, and the music information is downloaded from a network, such as the Internet. It is understood that, in some embodiments, the system for music information management **100** can comprise a display unit (not shown in FIG. **1**). The display unit can display related figures and interfaces, and related data such as the obtained music information. It is understood that, in some embodiments, the display unit may be a screen integrated with a touch-sensitive device (not shown). The touch-sensitive device has a touch-sensitive surface comprising sensors in at least one dimension to detect contact and movement of an input tool, such as a stylus or finger on the touch-sensitive surface. That is, users can directly input related data via the display unit. The processing unit **120** can control related components of the system for music information management **100**, and perform the methods for music information management, which will be discussed further in the following paragraphs.

[0028] FIG. **3** is a flowchart of an embodiment of a method for music information management of the invention. The method for music information management can be used in an electronic device, such as a computer, or a portable device, such as a digital camera, a handheld device such as a mobile phone, a smart phone, a PDA, a GPS, or any picture-taking device.

[0029] In step S**310**, it is determined whether audio data is generated in the electronic device. It is understood that, in some embodiments, the audio data can be generated for at least one music service application. In some embodiments, when the electronic device is implemented with an ANDROID system, the audio data is passed through a software module of AudioTrack in the framework of the ANDROID system, and related details are discussed later. If no audio data is generated (No in step S**310**), the procedure remains at step S**310**. If audio data is generated in the electronic device (Yes in step S**310**), in step S**320**, a control module is notified to launch a specific application, and in step S**330**, the specific application performs a music recognition procedure for the audio data, thus to obtain music information corresponding to the audio data. It is understood that, in some embodiments, the specific application can perform various methods to recognize the audio data, and the present invention is not limited to any music recognition method. Further, the music information corresponding to audio data may be various. For example, the music information may be a title of the music or an album corresponding to the audio data, lyrics of the music corresponding to the audio data, a singer name of the music corresponding to the audio data, background information of a singer of the music corresponding to the audio data, the albums which have been published by the singer of the music corresponding to the audio data and others. It is understood that, in some embodiments, the music information can be downloaded from a network, such as the Internet. It is noted that, after the audio data is generated, the audio data can be played by the electronic device. During the playback of the audio data, in step S**340**, the music information corresponding to the audio data is displayed in a user interface.

[0030] It is noted that, the performance of the music recognition procedure may be various according to different applications and requirements.

[0031] FIG. **4** is a flowchart of an embodiment of as performance of a music recognition procedure of the invention. In step S**410**, the specific application performs the music recognition procedure by analyzing a voice received via a microphone of the electronic device, wherein the voice corresponds to the playback of the audio data by the electronic device.

[0032] FIG. **5** is a flowchart of another embodiment of a performance of a music recognition procedure of the invention. In step S**510**, it is determined whether an earphone is plugged into the electronic device. If no earphone is plugged into the electronic device No in step S**510**), in step S**520**, the specific application performs the music recognition procedure by analyzing a voice received via a microphone of the electronic device, wherein the voice corresponds to the playback of the audio data by the electronic device. If an earphone is plugged into the electronic device (Yes in step S**510**), in step S**530**, the control module records the audio data, and in step S**540**, the specific application performs the music recognition procedure by analyzing the recorded audio data.

[0033] As described, when the electronic device is implemented with an ANDROID system the audio data is passed throng a software module of AudioTrack in the framework of the ANDROID system. FIG. **6** is a schematic diagram illustrating an example of music information management under the framework of ANDROID system. As shown in FIG. **6**, in the framework of ANDROID system, a music service application **602** may be implemented using an MediaPlayer **604** or an AudioTrack **612** in Java, in which the MediaPlayer **604** communicates with an AudioTrack **608** in CPP by way of an MediaPlayer Service **606**, and the AudioTrack **612** in Java communicates with an AudioTrack **608** in CPP. An AudioFlinger **610** obtains the audio data generated by the AudioTrack **608** in the FIFO, and plays the audio data. It is noted that, a link is established between the AudioTrack **608** and the control module **616**, such that the control module **616** can be notified when audio data is generated by the AudioTrack **608**. Further, when a RemoteControl function **614** is provided for the music service application, a link is established between the RemoteControl function **614** and the control module **616**, such that the control module **616** can be notified when a command is generated by the RemoteControl function **614**. The control module **616** is notified to launch a specific application **618** to perform the musk recognition procedure for audio data, thus to obtain the corresponding

music information. Also, the RemoteControl function **614** further obtains music information corresponding to the audio data, and provides the music information to the control module **616** for display. The control module **616** displays the obtained music information **620**.

[0034] After the specific application is triggered to perform the music recognition procedure, the music recognition procedure is further re-performed at different timings. FIG. **7** is a flowchart of an embodiment of a timing for launching a specific application to perform a music recognition procedure of the invention. In step S**710**, the control module periodically launches the specific application to perform the music recognition procedure. FIG. **8** is a flowchart of another embodiment of a timing for launching a specific application to perform a music recognition procedure of the invention. In the embodiment, a remote control function is provided in the electronic device. In step S**810**, it is determined whether a command is generated by the remote control function. If no command is generated by the remote control function (No in step S**810**), the procedure remains at step S**810**. If a command is generated by the remote control function (Yes in step S**810**), in step S**820**, the control module launches the specific application to perform the music recognition procedure for audio data. Then, the procedure returns to step S**810**.

[0035] Therefore, the methods and systems for music information management of the present invention can launch a specific application to perform a music recognition procedure for audio data of any music service application in the electronic device, thus to obtain and display corresponding music information during the playback of the audio data.

[0036] Methods for music information management, may take the form of a program code (i.e., executable instructions) embodied in tangible media, such as floppy diskettes, CD-ROMS, hard drives, or any other machine-readable storage medium, wherein, when the program code is loaded into and executed by a machine, such as a computer, the machine thereby becomes an apparatus for practicing the methods. The methods may also be embodied in the form of a program code transmitted over some transmission medium, such as electrical wiring or cabling, through fiber optics, or via any other form of transmission, wherein, when the program code is received and loaded into and executed by a machine, such as a computer, the machine becomes an apparatus for practicing the disclosed methods. When implemented on a general-purpose processor, the program code combines with the processor to provide a unique apparatus that operates analogously to application specific logic circuits.

[0037] While the invention has been described by way of example and in terms of preferred embodiment, it is to be understood that the invention is not limited thereto. Those who are skilled in this technology can still make various alterations and modifications without departing from the scope and spirit of this invention. Therefore, the scope of the present invention shall be defined and protected by the following claims and their equivalent.

What is claimed is:

1. A method for music information management for use in an electronic device, comprising:

when audio data is generated in the electronic device, notifying a control module to launch a specific application to perform a music recognition procedure for the audio data, thus to obtain music information corresponding to the audio data.

2. The method of claim **1**, further comprising displaying the music information corresponding to the audio data in a user interface during the playback of the audio data.

3. The method of claim **1**, wherein the specific application performs the music recognition procedure by analyzing a voice received via a microphone of the electronic device, wherein the voice corresponds to the playback of the audio data by the electronic device.

4. The method of claim **1**, wherein the music information comprises a title of the music or an album corresponding to the audio data, lyrics of the music corresponding to the audio data, a singer name of the music corresponding to the audio data, or background information of a singer of the music corresponding to the audio data.

5. The method of claim **4**, wherein the electronic device has a network connection capability, and the music information is downloaded from a network.

6. The method of claim **1**, wherein the audio data is generated for at least one music service application.

7. The method of claim **1**, wherein When a remote control function for music services is provided, in the electronic device, the method further comprises a step of notifying the control module to launch the specific application to perform the music recognition procedure when a command is generated by the remote control function.

8. The method of claim **1**, wherein when a remote control function for music services is provided in the electronic device, the method further comprises steps of obtaining music information corresponding to the audio data by the remote control function, and providing the music information to the control module for display by the remote control function.

9. The method of claim **1**, further comprising periodically launching the specific application to perform the music recognition procedure by the control module.

10. A system for music information management for use in an electronic device, comprising:

a storage unit comprising a specific application; and

a processing unit, when audio data is generated in the electronic device, notifying a control module to launch the specific application to perform a music recognition procedure for the audio data, thus to obtain music information corresponding to the audio data.

11. The system of claim **10**, further comprising a display unit for displaying the music information corresponding to the audio data in a user interface during the playback of the audio data.

12. The system of claim **10**, wherein the specific application performs the music recognition procedure by analyzing a voice received via a microphone of the electronic device, wherein the voice corresponds to the playback of the audio data by the electronic device.

13. The system of claim **10**, wherein the music information comprises a title of the music or an album corresponding to the audio data, lyrics of the music corresponding to the audio data, a singer name of the music corresponding to the audio data, or background information of a singer of the music corresponding to the audio data.

14. The system of claim **13**, wherein the electronic device has a network connection capability, and the music information is downloaded from a network.

15. The system of claim **10**, wherein the audio data is generated for at least one music service application.

16. The system of claim **10**, wherein when a remote control function for music services is provided in the electronic device, the method further comprises a step of notifying the control module to launch the specific application to perform the music recognition procedure when a command is generated by the remote control function.

17. The system of claim **10**, wherein when a remote control function for music services is provided in the electronic device, the remote control function further obtains music information corresponding to the audio data, and provides the music information to the control module for display.

18. The system of claim **10**, further comprising periodically launching the specific application to perform the music recognition procedure by the control module.

19. A machine-readable storage medium comprising a computer program, which, when executed, causes a device to perform a method for music information management, wherein the method comprises:

when audio data is generated in the electronic device, notifying a control module to launch a specific application to perform a music recognition procedure for the audio data, thus to obtain music information corresponding to the audio data.

* * * * *